Ethnic Networks in FDI and the Impact of Institutional Development

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Abstract

Ethnic Chinese entrepreneurs are known for their active business networking practices, particularly in Southeast Asia. This paper empirically investigates the role of ethnic Chinese networks in promoting foreign direct investment (FDI). We further evaluate whether the effectiveness of networking activities are affected by the level of economic and institutional development of the source and the host countries. Using a standard gravity model, we find that ethnic Chinese networks are significant in facilitating cross-border investment between countries. The strength of ethnic Chinese networks between country pairs, approximated by the product of the numbers of ethnic Chinese in both countries, is positively correlated with the cumulative amount of their reciprocal FDI. More importantly, this significant relationship is not limited to countries in Southeast Asia, but is applicable to other country pairs included in the study as well, regardless of whether the investment is originated from industrial countries or developing economies. Finally, the analysis finds no evidence that ethnic networks are only effective in countries where economic and legal institutions are under-developed. Ethnic Chinese networks have played a significant role in promoting FDI to countries with a relatively higher bureaucratic quality, much more so than to countries with a lower bureaucratic quality.

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1. Introduction

The importance of business and social networks in facilitating trade has been the focus of many recent studies, both theoretical (Greif, 1993; Rauch and Casella, 1998) and empirical (Gould, 1994; Rauch and Trindade, 2002). Theoretical analyses point out that networking activities play a key role in overcoming informational barriers in international transactions, as well as providing community sanctions that ensure the enforcement of contracts in a weak international legal environment. Empirical analyses show that networks significantly increase bilateral trade, especially trade in differentiated goods, suggesting that networking activities are vital in forming a match between buyers and sellers where complex information is needed.

The role of networks in promoting cross border investment has not been studied extensively. FDI requires large starting costs and intensive information. Compared to trade, FDI calls for cooperation and commitment at a much deeper level between the parties concerned. It is therefore reasonable to expect that ethnic networks would play a more important role in assisting bilateral FDI than in encouraging trade.

Among the various types of business networks, coethnic networks have tended to attract empirical research, since it is much easier to identify their members. Overseas Chinese[1] have been the most well-known ethnic networks active in trade and in direct investment (Weidenbaum and Hughes, 1996; Redding, 1995). The vigorous networking activity among ethnic Chinese in Southeast Asia and their commercial success have both been highly visible, and these networks are believed to have played a crucial role in some of the region's fast growth in recent decades.

Like many other ethnic groups living outside their countries of origin, overseas Chinese create various formal or informal associations. These associations have traditionally been based on kinship, dialect and place of origin in China, and were established partly to provide assistance to those in need in the community, especially new immigrants. As an ethnic Chinese community becomes more commercially developed, these associations begin serving as centers where information exchange takes place between coethnic business people working both locally and internationally. It is possible to consider overseas Chinese as forming a set of inter-connected networks at various local and national levels, especially in Southeast Asia, but not a unified international system.

This paper contributes to the literature by empirically investigating the impact of ethnic Chinese networks on promoting bilateral FDI. It will concentrate on three issues. First, do ethnic Chinese networks significantly increase the cumulative amount of FDI between countries? The answer to this question is important to governments in formulating policies. For example, policies encouraging

cooperation between ethnic minorities and their overseas counterparts may generate significant benefits to a country's long-term growth. Second, is the importance of ethnic Chinese networks specific to Southeast Asian economies? Third, is the effectiveness of ethnic Chinese networks in promoting FDI conditional on a low level of institutional development in the host countries? If the effectiveness of ethnic networks on FDI is limited to these special situations, then less attention need be paid to the issue.

In the next section, the author specifies the empirical model and the variables used in the estimation are discussed. Section 3 describes the data and specifies the measures. The empirical results are presented and the implications are discussed in section 4. Section 5 concludes.

2. Empirical Model

Gravity Model Specification

This study uses the gravity specification to examine the effects of ethnic Chinese net-working on bilateral FDI. Gravity specification is widely used in trade literature and its basic model states that the total amount of trade between two countries is directly related to the product of their economic masses (GDP or GNP) and inversely related to the distance between them. Per capita income is also often included in gravity models (e.g. Eaton and Tamura, 1994). Gravity models have attracted widespread attention because of their empirical success in predicting bilateral trade volumes. Recent theoretical works (e.g.Anderson, 1979; Bergstrand, 1985, 1989; Deardorff, 1995) show that gravity specification is consistent with various trade models. In addition to the basic elements, various factors that either aid or deter trade are also included in the standard gravity models. For example, dummy variables are included to indicate special relations between the two trading countries, such as a former colonial relationship, a common native language, geographical proximity, and common membership of a trading bloc (Frankel, 1997; Rauch and Trindade, 2002).

Recent studies have employed gravity models to predict the amount of FDI (Eaton and Tamura, 1994; Morsink, 1998;Wei, 1998). Morsink, for example, developed a model incorporating factors thought to affect firms' investment decisions: many of the variables are similar to those used in the trade models, such as total market size of the host country, per capita income, labor cost, and cultural differences.

The use of the gravity model to estimate bilateral FDI implies the view that trade and foreign investment, to a large extent, complement each other. Standard trade models would predict that trade and international production factor mobility are substitutes (e.g. Mundell, 1957). Empirical studies, however, have shown that more often than not, trade and international factor mobility complement

each other (e.g. Lipsey and Weiss, 1981; Collins, O'Rourke and Williamson, 1997; Head and Ries, 2001; Hejazi and Safarian, 2001). These studies provide empirical support for using the gravity model in estimating bilateral FDI. In addition, included is a measure of a host country's trade intensity in the model to investigate the question of complementarity between trade and direct investment.

Some theoretical models of FDI (e.g. Helpman, 1984; Markusen, 1995) that emphasize the role of multinational corporations (MNCs) and their firm specific assets also generate testable implications for the location of investment. For example, industrial countries tend to be home to multinationals with firm specific assets that are the dominant sources of FDI. Compared to their counterparts in industrial countries, MNCs in developing countries generally possess less firm specific advantages. As a result, FDI from developed and developing countries, may respond to external factors differently. These models also suggest that large countries, especially those with a large unskilled labor force, may be the dominant host countries for multinationals, and that trade barriers may affect FDI, depending on the type of investment. For example, high trade barriers encourage horizontal direct investment[2] between large industrial countries where countries are similar in size and in relative endowments, but discourage vertical direct investment between industrial countries and developing countries where relative endowments are unbalanced. In the empirical models, the GNP and per capita GNP of the source and the host countries could be seen as measures of a country's size and relative endowment with skilled labor, and included is a measure on the level of host countries' trade barriers to examine its impact on bilateral FDI. Also estimated separately are determinates of FDI originating from industrial and developing countries.

Ethnic Chinese Networks

This paper intends to investigate the significance of ethnic Chinese networks in facilitating bilateral FDI. Earlier work has suggested two major mechanisms, whereby coethnic networks promote international business transactions such as trade and investment. One mechanism, established by Greif (1993), is that coethnic networks provide community enforcement of sanctions to deter violations of contracts in a weak international legal environment. An alternative mechanism, emphasized in more recent work by Gould (1994) and Rauch and Casella (1998), is that coethnic networks promote FDI by providing foreign investors with important information in respect of the domestic market, local government regulations, and potential business partners that may otherwise be difficult or costly to obtain.

Both these mechanisms could be at work simultaneously, and it is difficult to distinguish the two empirically. However, to assess the two mechanisms' relative importance, we divide the FDI data into two groups and estimate the gravity model separately. The first group includes FDI destined to

countries with weak institutions and the second includes FDI destined to countries with strong institutions. If networks are more significant in FDI to countries with weak institutions, it is reasonable to conclude that the contract enforcement function of networks is relatively important.

Introduction of the Variables

Following the usual gravity model specifications, the author includes the total GNPs of both the source country and the host country, as well as the distance between the two. The first two are expected to have a positive influence on total FDI and a negative sign for the distance between the two. Also included are the host country's GNP growth rate to capture the impact of a country's market growth on its inward FDI.

Unlike other studies, included are the total populations of the source and the host countries instead of per capita GNPs. First of all, combining GNP and population can produce equivalent measures for the effect of per capita incomes. There is a more important reason. As will be explained later, the numbers of ethnic Chinese will be included in the model. It is possible that the number of ethnic Chinese in a country is correlated with its population. Including total population in the analysis will exclude the possible effect of population on FDI.

Beside the basic factors, additional variables are included to reflect their possible role in either impeding or assisting FDI between countries. One such factor is whether two countries are adjacent to one another. Studies suggest that there are advantages in trading with neighboring countries and examine whether sharing a common border may also have an additional positive impact on FDI. Studies also indicate that regional trading blocs affect the bilateral FDI of the member states. Two dummy variables, EEC and EFTA, are added to indicate membership in the European Community and the European Free Trade Association.[3] The model also includes a variable indicating whether two countries have former colonial ties, which may provide investors with advantages in terms of a relatively familiar social and political environment. It may also capture the effect of some widely used second language or official language in many former colonies. Finally, studies suggest that country pairs remotely located from the rest of the world tend to have closer trade relations (e.g. Wei, 1998; Rauch and Trindade, 2002).

As discussed earlier, included is the host country's trade intensity and barriers to trade in the empirical model. Trade intensity is included to explore the relation between trade and FDI. By including a measure on barriers to trade, it can be assessed whether tariff jumping is an important motivation for FDI. In addition, as high tariffs have been held to increase horizontal FDI and decrease vertical FDI, this measure can also be used to examine the relative importance of the two types of FDI.

To examine the impact of ethnic Chinese networks on bilateral FDI, we add the product of the numbers of ethnic Chinese in the source and the host countries into the empirical model. It is a proxy of the strength of ethnic Chinese networks between two countries and could be interpreted as the total number of potential connections between the ethnic Chinese populations in the two countries.[4] One concern is that this measure could have possibly captured a common language effect. Clearly, it is much easier for people speaking the same language to communicate and to make business deals. In addition, a shared mother tongue often implies similar cultural and social values. It is particularly important to recognize the effect of a common language when studying the role of ethnic Chinese. Many ethnic Chinese, especially those in South-east Asia, share one or more dialects, including Hokkien, Teochiu, Cantonese, and Hakka. Without considering the common language factor, it is debatable whether a positive effect of this measure on ethnic Chinese networks is in fact attributable to the networking. To account for the common language effect, include a variable measuring the extent to which two countries share a common native language.

Basic Empirical Model

Based on these principles, the basic gravity model can now be written out as follows:

$$FDI_{ij} = \alpha GNP_i^{\beta_1} GNP_j^{\beta_2} POP_i^{\gamma_1} POP_j^{\gamma_2} DIST_{ij}^{\delta} * REM_i^{\varepsilon_i} REM_j^{\varepsilon_2}$$
$$* TAR_j^{\tau_2} TRADE_j^{\rho_2} CHIN_{ij}^{\psi} \exp(\xi ADJ_{ij} + \eta EEC_{ij} + \theta EFTA_{ij}$$
$$+ \lambda LANGUAGE_{ij} + \varphi COLOTIE_{ij} + \omega_2 GROGDP + \mu_{ij})$$
$$(1)$$

where subscripts $_1$ and $_2$ denote the coefficients for the source country and the host country; FDI_{ij} denotes the nominal value of total FDI stock from country i to country j in 1990;[5] GNP_i, GNP_j denote the nominal GNPs of country i and country j in 1990; POP_i, POP_j denote the total populations in country i and country j in 1990; $DIST_{ij}$ equals the great circle distance[6] between the principal cities of country i and j; REM_i, REM_j are the weighted sum of country i's and country j's distances from all other countries in the sample. The weights are the nominal GNPs of the other countries; ADJ_{ij} equals 1 if country i and j share a land border and 0 otherwise; EEC_{ij} equals 1 if countries i and j are both members of the European Community and 0 otherwise. $EFTA_{ij}$ equals 1 if countries i and j are both members of the European Free Trade Association and 0 otherwise. $LANGUAGE_{ij}$ is a measure of the extent to which countries i and j share birth languages which will be explained in the next section; $COLOTIE_{ij}$ equals 1 when i and j share a former colonial tie and 0 otherwise; TAR_j is the host country j's average tariff rate for the years 1985 to 1990; $TRADE_j$ is the host country j's average trade to GDP ratio for the years 1985 to 1990; $GRPGDP_j$ is the host country j's annual average GDP

growth rate between 1985 and 1990; $CHIN_{ij}$ is the product of the numbers of ethnic Chinese in country i and j in 1990; m_{ij} is a Gaussian white noise error term associated with FDI_{ij}.

The dependent variable, FDI_{ij}, is non-negative and thus bounded below by zero. Following Eaton and Tamura (1994) a modified gravity model is estimated. It assumes that the actual FDI will be strictly positive only when the right-hand side of the equation achieves a minimum threshold value A. The gravity model to be estimated is thus

$$
\begin{aligned}
FDI_{ij} = \max\big[&-A + \alpha GNP_i^{\beta_1} GNP_j^{\beta_2} POP_i^{\gamma_1} POP_j^{\gamma_2} DIST_{ij}^{\delta} REM_i^{\varepsilon_i} REM_j^{\varepsilon_2} \\
&* TAR_j^{\tau_2} TRADE_j^{\rho_2} CHIN_{ij}^{\psi} \exp(\xi ADJ_{ij} + \eta EEC_{ij} + \theta EFTA_{ij} \\
&+ \lambda LANGUAGE_{ij} + \varphi COLOTIE_{ij} + \omega_2 GROGDP + \mu_{ij}), 0\big].
\end{aligned}
\tag{2}
$$

Rearranging and taking natural logarithms of both sides yields

$$
\begin{aligned}
\ln(A + FDI_{ij}) = \max\big[&\ln\alpha + \beta_1 \ln GNP_i + \beta_2 GNP_j + \gamma_1 \ln POP_i + \gamma_2 \ln POP_j \\
&+ \delta \ln DIST_{ij} + \varepsilon_1 \ln REM_i + \varepsilon_2 \ln REM_j + \tau_2 \ln TAR_j \\
&+ \rho_2 \ln TRADE_j + \psi \ln CHIN_{ij} + \xi ADJ_{ij} + \eta EEC_{ij} + \theta EFTA_{ij} \\
&+ \lambda LANGUAGE_{ij} + \varphi COLOTIE_{ij} + \omega_2 GROGDP + \mu_{ij}), \ln A\big].
\end{aligned}
\tag{3}
$$

Equation (3) is estimated using the maximum likelihood method, where the likelihood function is constructed using a threshold Tobit model. The detailed estimation procedures can be found in Eaton and Tamura (1994).

FDI Involving Southeast Asian Economies

To convincingly account for the impact of ethnic Chinese networks in promoting FDI, it should be recognized that the unique and important role of ethnic Chinese in South-east Asia. It is estimated almost 37 million ethnic Chinese are living outside mainland China and Taiwan. Nearly 90% of them reside in Southeast Asia. The presence of ethnic Chinese in many Southeast Asian economies is not only substantial, but also economically significant. Ethnic Chinese networks in Southeast Asia have a longer history and are better established than in other parts of the world. Thus, it might be expected that the influence of ethnic Chinese on FDI to be stronger within the South-east Asian region than elsewhere. To identify differences in the importance of ethnic Chinese networks, estimate three coefficients on ethnic Chinese networking, one for country pairs where both are in Southeast Asia, one for country pairs where either the source or the host country is in Southeast Asia, and one for the country pairs where neither is in Southeast Asia.

Another concern is the possible impact on the estimation results of ethnic Chinese networks if investment in China is included. Overseas Chinese have played an essential role in investing in China. Until recently, the bulk of FDI in China originated from neighboring Southeast Asian economies where ethnic Chinese account for a significant fraction of their economies. In addition, within China, FDI is concentrated in two southeastern provinces that are "home" for most ethnic Chinese outside mainland China and Taiwan. One could argue that investment by overseas Chinese in China may not be motivated by economic interests, and that the results could be misleading if these investments are included in the analysis. In this empirical analysis, the model is re-estimated excluding FDI to China, and similar results are obtained.[7]

3. Data and Measurement

The sample includes 70 countries (Table 1).[8] These include 16 countries in the Americas, 11 in East and Southeast Asia, 14 in Africa, 5 in West Asia, 4 in Oceania, 15 in Western Europe, and 5 in Eastern Europe. Of the fifteen Western European countries, 10 were member countries of the EEC and 5 members of EFTA.

Data for GNP in current dollars were obtained from the IMF International Financial Statistics for 1990. Information used to construct the variable on adjacency was obtained from the web page for Empirical Investigation in International Trade (EIIT, http://www.eiit.org). European Community membership and European Free Trade Association membership are from Frankel (1997). The variable for colonial ties was constructed on the basis of articles in the *Encyclopedia Britannica* (1997). Data on the countries' unweighted average tariff rates between 1985 and 1990, as well as the coun-tries' trade to GDP ratio and their GDP values in constant dollars for the years 1985 and 1990, came from the World Development Indicators 2000 (World Bank, 2000). The latter was used to calculate its GDP growth rate.

Most of the data on ethnic Chinese populations came from Poston et al. (1994). Supplementary information was obtained from the *Overseas Chinese Economy Yearbook 1990* (Overseas Chinese Affairs Commission, 1991) and Tao (1994). Three language variables were constructed to account for the effect of a common native language between countries. The simplest of the three measures is a dummy variable. It takes the value of one if at least 10% of the populations share a common native language and zero otherwise. It was constructed on the basis of country articles in the *Encyclo-pedia Britannica*, combined with *Ethnologue* (Grimes, 1992).[9]

Table 1. *Countries, Their Ethnic Chinese Population and Total Population Around 1990*

Country	Chinese (thousand)	Population (million)	Country	Chinese (thousand)	Population (million)
Americas			European Free Trade Area (EFTA)		
* Canada	680.00	26.58	* Austria	6.00	7.72
* United States	164.55	249.91	* Finland	0.01	4.99
* Argentina	20.00	32.55	Norway	0.95	4.24
* Brazil	100.00	144.72	* Sweden	12.00	8.56
* Chile	13.00	13.17	Switzerland	5.00	6.71
* Columbia	4.00	32.30			
* Ecuador	15.00	10.26	Other countries		
* Mexico	20.00	86.15	* Australia	300.00	17.06
* Peru	500.00	21.55	* New Zealand	35.00	3.36
* Venezuela	15.00	19.33	South Africa	36.00	37.07
* Bolivia	4.00	6.57	* Turkey	60.00	56.10
* Paraguay	7.00	4.22	Libya	0.40	4.15
* Uruguay	0.35	3.09	* Nigeria	2.00	96.16
* Dominican	0.65	7.17	* Egypt	0.11	52.69
Republic			* Morocco	0.02	24.49
* El Salvador	0.90	5.17	* Kenya	0.15	24.03
* Jamaica	20.00	2.42	* Cameroon	0.01	11.53
			* Gabon	0.05	1.15
East and Southeast Asia			Liberia	0.12	2.41
* Japan	150.34	123.53	Mauritius	35.00	1.06
* Indonesia	731.50	179.83	Togo	0.03	3.53
Taiwan	20,095.00	20.11	Tanzania	0.51	25.64
* Hong Kong	568.61	5.70	Zaire	0.20	35.56
* Korea	22.84	42.87	* Zimbabwe	0.40	9.37
* Malaysia	547.17	17.76	* Bangladesh	0.70	108.12
* Philippines	820.00	61.48	* Sri Lanka	3.50	16.99
* Singapore	211.27	2.70	* Pakistan	3.60	112.04
* Thailand	6,000.00	56.08	* India	21.00	834.72
* P.R. China	1,080,210.00	1,155.28	Fiji	8.00	0.73
* Vietnam	2,000.00	66.23	* Papua New	6.80	3.70
			Guinea		
European Community (BC)			* Hungary	0.02	10.36
* France	200.00	56.74	* Poland	0.08	38.12
Germany	39.50	79.37	Bulgaria	0.03	8.99
Italy	20.66	57.66	Czechoslovakia	0.02	15.66
* United Kingdom	125.00	57.56	* Romania	0.04	23.21
* Belgium	13.36	10.35			
Denmark	6.00	5.14			
* Netherlands	45.50	14.95			
* Ireland	1.00	3.50			
* Portugal	4.70	9.90			
* Spain	15.00	38.96			

Note: *Identifies the 54 countries whose inward FDI reports are used to compile data on bilateral FDI.

Two continuous language variables were also constructed using the formula $\sum |s_{il} s_{jl}|$ for country pair i and j. s_{il} is the share of native speakers of language l in county i and s_{jl} is the equivalent share in country j. The share was obtained by dividing the number of native speakers of each language obtained from *Ethnologue* by the midyear population estimates for the corresponding years in the *United Nations Demographic Yearbook*.[10]

Indices on institutional development for 1990 came from International Country Risk Guide (ICRG), a monthly publication of Political Risk Services. Of the five indices[11] provided in the original data, the scores on bureaucratic quality were thought to be the most relevant and were used to indicate a host country's institutional development.

Unlike Wei (1998) and Morsink (1998), who both used FDI from OECD data, bi-lateral FDI data were assembled from the United Nations' *World Investment Directory*. The advantage is that the *Directories* include not only investments from OECD countries and other industrial nations, but investments originating from developing countries as well. Unfortunately, the *Directories* contain only one volume for each region, and individual volumes were published in different years. Even within the same volume, information for different countries differs in the years when FDI is reported. As a result, the data obtained for different country pairs are figures for different years.[12] To minimize the possible problems rising from this temporal inconsistency, the FDI stocks were used rather than the flows in the estimation. This approach might also be helpful in limiting the effect of factors that cause short-term fluctuations in yearly FDI flows. In addition, a variable was included in this estimation to indicate the year in which the amount of FDI was reported.

The data on bilateral FDI was gathered from the reports of 54 host countries on inward investment and these reports identify 69 source countries.[13] If bilateral FDI was reported for all the country pairs, 0 or positive, there should be more than 3600 observations, but only 1329 valid observations were actually obtained.[14] Table 2 is a summary of the FDI data. The total FDI stock reported amounted to US\$1.06 billion. The bulk of FDI was originated from industrial countries (96%), and was destined to industrial countries (83%). More than 80% of total FDI takes place between industrial countries.

Table 2. Summary for FDI Data

FDI source			Industrial countries	Developing countries	All
			FDI destination		
Industrial countries	Average	US$ million	3,659	287	1,290
	Subtotal	US$ million	856,169	158,788	1,014,957
	Number of observations		234	553	787
Developing countries	Average	US$ million	98	66	78
	Subtotal	US$ million	19,737	22,421	42,158
	Number of observations		202	340	542
All countries	Average	US$ million	2,009	203	809
	Total	US$ million	875,905	181,209	1,057,115
	Number of observations		436	893	1,329

4. Results of Estimation

Basic Estimation Results

In this section, estimates are presented using the full sample. Empirical results in Table 3 are obtained from both the threshold Tobit method as well as the OLS method.[15] While the results of the two methods are generally consistent, the discussions will focus on those from maximum likelihood estimation of the Tobit model.

The first two columns give estimates excluding $CHIN_{ij}$, the measure for ethnic Chinese networks. The OLS results suggest that the model explains close to 40% of the total variance in FDI. The Tobit model produced significant estimates for the basic variables with expected signs. In the following presentations, equations are written in terms of GNPs and per capita GNPs for more conventional interpretations.

$$\ln(60 + FDI_{ij}) = \max[-2091 + 0.84\ln GNP_i + 1.22 GNP_j$$
$$+ 0.64\ln PGNP_i - 1.01\ln PGNP_j - 0.65\ln DIST_{ij} + \mathbf{A}X_{ij}, \ln 60]$$

where X_{ij} represents the other variables in the model.

Bilateral FDI responds positively to the GNPs of both the source and the host coun-tries and the per capita GNP of the source country, and negatively to per capita GNP of the host country and the distance between the two. The higher a source country's GNP and per capita GNP, the more its firms will enjoy specific advantages and bene-fits from investing abroad. For the host country, the higher its GNP and the lower its per capita GNP, the larger the potential market and the lower the average labor cost. These suggest that cross-border investment is motivated by both large markets and lower labor costs. The results also suggest that distance is a significant deterrence to FDI between two countries and its magnitude (-0.65), is compatible to that obtained for trade in differentiated goods.[16]

For the other variables in the model, it is found that members of the European Com-munity invest significantly more with each other than with other countries, but this is not the case for the members of the European Free Trade Association. Furthermore, former colonial ties and a common native language are also important in promoting bilateral FDI between countries.

The level of a country's tariffs does not have a significant impact on its inward FDI, and tariff jumping was therefore not found to be an important motivation for FDI in the full sample. On the other hand, the ratio of a country's total trade to its GDP is positively associated with its FDI, and therefore no evidence is found to suggest that trade and FDI are substitutes. In addition, it is found that the coefficient on host country's GDP growth is negative and significant. This result might be due to various factors. For example, GDP growth rates for some less-developed countries have been quite high in recent years, as they started from very low bases. Since these countries have opened their economy to foreign investors only for a short period, the level of accumulated FDI is still rather low (for example, in Vietnam, Kenya, and Pakistan). On the other hand, industrial countries that have accumulated the longest and largest FDI may have suffered a serious slowdown in economic growth in recent years. In addition, the effect of fast growth, indicating a large potential market, might have partially been captured by a country's total GNP.

Finally, it is noticed that a country remote from the rest of the world seems to be more attractive for FDI. It might be that the cost of serving a remote market through trade is relatively high and thus direct investment is a better alternative. On the other hand, remoteness from the major global markets does not seem to be important in driving outward FDI. In addition, there is no sign that neighboring countries invest more with each other. The coefficient is positively but statistically insignificant. Presentations of estimation results in the following sections will focus on the impact of ethnic Chinese networks.

Table 3. Gravity Model Estimation Using the Full Sample

	Model 1		Model 2		Model 3	
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
$Ln\,GNP_i$	1.60***	1.48***	1.44***	1.33***	1.36***	1.25***
$Ln\,GNP_j$	0.04	0.21***	−0.03	0.15*	−0.14#	0.04
$Ln\,POP_i$	−0.70***	−0.64***	−0.78***	−0.71***	−0.76***	−0.69***
$Ln\,POP_j$	1.24***	1.01***	0.78***	0.59***	0.97***	0.78***
$Ln\,CHIN_{ij}$			0.21***	0.19***		
$\quad Ln\,CHIN_{ij}*SE\_ASIA2$					0.25***	0.22***
$\quad Ln\,CHIN_{ij}*SE\_ASIA1$					0.18***	0.16***
$\quad Ln\,CHIN_{ij}*SE\_ASIA0$					0.28***	0.26***
$Ln\,DIST_{ij}$	−0.66***	−0.65***	−0.74***	−0.74***	−0.69***	−0.69***
EEC_{ij}	2.88***	2.47***	2.48***	2.09***	2.34***	1.96***
$EFTA_{ij}$	−0.16	0.14	−0.21	0.10	0.03	0.33
$Ln\,REM_i$	0.06	0.09	−1.04***	−0.92***	−1.21***	−1.07***
$Ln\,REM_j$	3.06***	3.05***	1.47***	1.58***	1.38***	1.52***
$Ln\,TAR_j$	−0.08	−0.04	0.12	0.16	0.02	0.06
$Ln\,TRADE_j$	2.09***	1.97***	1.34***	1.28***	1.60***	1.55***
$GROGDP_j$	−0.19***	−0.16***	−0.21***	−0.18***	−0.22***	−0.19***
ADJ_{ij}	0.58	0.40	0.58	0.39	0.63	0.43
$COLOTIE_{ij}$	0.96***	0.78***	1.02***	0.85***	1.11***	0.92***
$LANGUAGE_{ij}$	1.78***	1.58***	1.43***	1.25***	1.10***	0.96***
Constant	−2,091***	−2,091***	−3,718***	−3,588***	−3,821***	−3,695***
A		59.65***		59.98***		59.94*
Adjusted R^2	0.37		0.39		0.40	
Log likelihood	−3,515	−14,606	−3,487	−14,578	−3,479	−14,571
LR test			56.24	55.60	15.24	15.80
LR test significant level			1%	1%	1%	1%
Number of observations	1,329					

Note: ***, **, *, and # denote the significance level of 1%, 5%, 10% and 15%, respectively.
SE_ASIA2 is 1 when both the source and the host countries are in Southeast Asia and 0 otherwise, SE_ASIA1 is 1 when either the source or the host country is in Southeast Asia and 0 otherwise; and SE_ASIA0 is 1 when neither countries is in Southeast Asia.

The third and the fourth columns present estimation results including a measure on ethnic Chinese networking, $CHIN_{ij}$. The inclusion improves the model's overall fitness significantly and the coefficient on $CHIN_{ij}$ is positive (0.19) and significant, suggesting that ethnic Chinese networks significantly increase bilateral FDI. Because of the threshold Tobit model structure, the coefficients cannot be readily interpreted as percentage change of FDI in response to a percentage change in $CHIN_{ij}$. As the estimated threshold, A, is positive and significant, the presence or the increase of ethnic Chinese could mean to increase bilateral FDI for zero to positive. In that case, the marginal impact is infinite. When positive FDI exists, the coefficient is the lower bound for the percentage change of FDI stock as a result of a 1% increase in $CHIN_{ij}$. In other words, a 1% increase in the ethnic Chinese population in both countries will correspond to an increase in total bilateral FDI of at least 0.38%.[17]

The discussion in the previous section has noted that the impact of ethnic Chinese networks on cross-border investment involving Southeast Asian economies may differ from that involving countries elsewhere. To identify such differences, country pairs are divided into three groups. In the

first group, both the source and the host country are in Southeast Asia. In the second group, either the source or the host country is in Southeast Asia. In the third group, neither is in Southeast Asia.[18] Separate estimates on $CHIN_{ij}$ are obtained for the three groups and the new results—showing positive significant impacts of Chinese networks in all three groups—are presented in columns 5 and 6 of Table 3. The highest coefficient for $CHIN_{ij}$, 0.26, is for country pairs outside Southeast Asia, and the lowest is where only one of the pairs is in Southeast Asia (0.16). This might suggest that there is decreasing marginal effect of ethnic Chinese networking on bilateral FDI, combined with region-specific factors that support net-working in the Southeast Asia.[19]

The above survey shows that ethnic Chinese networks, approximated by the product of the numbers of ethnic Chinese in the two countries, are important in promoting bilateral FDI between all country pairs included in this study. A 1% increase in the total number of ethnic Chinese in each of the two countries corresponds to an increase of at least 0.52% in total bilateral FDI for country pairs outside Southeast Asia, 0.44% for country pairs where one is in Southeast Asia, and 0.32 for country pairs where both are in Southeast Asia.

Industrial Versus Developing Countries and Ethnic Chinese Networks

The discussion earlier suggests that FDI from developing economies may demonstrate different features than that from industrial countries. This proposition is now exam-ined by dividing the full sample into two sub-groups according to the source countries of bilateral FDI and estimate the empirical equation separately. In the left panel of Table 4, the dependent variable is bilateral FDI originating from industrial countries;[20] in the right panel, the dependent variable is FDI originating from developing economies. The results from the two panels are qualitatively the same,[21] while OLS estimation indicates that the gravity specification accounts for a larger portion of total variance for FDI originating from industrial countries. The adjusted R-squared is 37% for the left panel, and about 20% for the right panel. Table 4 also indicates that the percentage change in bilateral FDI in response to a percentage change in the basic factors differs in magnitude between the two panels. To see that, first rewrite the equations in the following format based on column 2 of the two panels.

Table 4. *Gravity Model Estimation for FDI from Industrial Countries and Developing Countries*

	Dependent variable: FDI from industrial countries				Dependent variable: FDI from developing countries			
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
$Ln\,GNP_i$	2.97***	2.51***	3.01***	2.54***	0.89***	0.85***	0.71***	0.67***
$Ln\,GNP_j$	0.48***	0.66***	0.38***	0.57***	−0.47***	−0.34***	−0.52***	−0.38***
$Ln\,POP_i$	−1.80***	−1.45***	−2.23***	−1.82***	−0.48***	−0.47***	−0.51***	−0.50***
$Ln\,POP_j$	0.96***	0.65***	0.33*	0.10	1.50***	1.37***	1.05***	0.93***
$Ln\,CHIN_{ij}$			0.32***	0.28***			0.16***	0.15***
$Ln\,DIST_{ij}$	−0.65***	−0.70***	−0.91***	−0.93***	−0.51**	−0.48***	−0.57***	−0.54***
EEC_{ij}	2.75***	2.08***	2.29***	1.67***				
$EFTA_{ij}$	−0.25	0.12	−0.11	0.27				
$Ln\,REM_i$	−0.11	0.01	−0.75*	−0.55#	1.71**	1.60**	−0.12	−0.17
$Ln\,REM_j$	3.82***	3.66***	1.91***	2.01***	1.73**	1.84***	0.37	0.53
$Ln\,TAR_j$	−0.10	−0.04	0.33	0.34*	−0.09	−0.05	0.04	0.09
$Ln\,TRADE_j$	1.78***	1.52***	0.91**	0.77**	2.09***	2.16***	1.24**	1.34**
$GROGDP_j$	−0.19***	−0.13***	−0.21***	−0.16***	−0.21***	−0.19***	−0.21***	−0.19***
ADJ_{ij}	0.62	0.43	0.36	0.20	0.66	0.58	0.76	0.66
$COLOTIE_{ij}$	1.32***	1.10***	1.42***	1.19***	0.98**	0.88*	1.07**	0.97**
$LANGUAGE_{ij}$	2.11***	1.80***	1.51***	1.28***	0.80	0.71#	0.61	0.52
Constant	−3,094***	−2,997***	−6,023***	−5,535***	−1,937	−1,801#	−2,897*	−2,745**
A		152.41***		153.70***		32.99***		33.13***
R2-adj	0.37		0.42		0.20		0.22	
Log likelihood	−2,005	−9,732	−1,975	−9,697	−1,448	−4,795	−1,440	−4,787
LR test		60.62		68.76		16.08		17.04
LR test significant level		1%		1%		1%		1%
Number of observations	787				542			

Note: ***, **, *, and # denote the significance level of 1%, 5%, 10% and 15%, respectively.

For FDI originating from industrial countries:

$$\ln(152+FDI_{ij}) = \max[-2997 + 1.60\ln GNP_i + 1.31GNP_j \\ + 1.45\ln PGNP_i - 0.65\ln PGNP_j - 0.70\ln DIST_{ij} + \mathbf{A}X_{ij}, \ln 152].$$

For FDI from developing economies:

$$\ln(33+FDI_{ij}) = \max[-1801 + 0.38\ln GNP_i + 1.03GNP_j \\ + 0.47\ln PGNP_i - 1.37\ln PGNP_j - 0.48\ln DIST_{ij} + \mathbf{A}X_{ij}, \ln 33].$$

The results show that FDI from industrial countries is relatively more sensitive to source country variables, while FDI from developing countries is relatively more sensitive to host country variables. It is possible that, as multinationals from developing countries possess relatively less firm

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specific assets, cost advantage in a foreign location is a much stronger motivation for production relocation. In addition, distance is a more significant deterrent to FDI from industrial countries. A shared native language is important for investors in industrial countries, but is almost irrelevant for investors in developing countries.

Columns 3 and 4 give model estimates while measures on ethnic Chinese network-ing are included. In both panels, the inclusion improves the model significantly and the impact of ethnic Chinese networks is positive and significant. The magnitude of the estimates on $CHIN_{ij}$ is larger for FDI from industrial countries (0.28) than for FDI from developing countries (0.15). The results show that ethnic Chinese networking is significant in promoting bilateral FDI and the importance, on the margin, seems to be stronger for investors in industrial countries.[22]

Bureaucratic Quality and Ethnic Chinese Networks

Empirical results show that gravity specification has generated consistent results for FDI, regardless of whether the investment is originated from industrial or developing economies. More importantly, ethnic Chinese networking is found to be important in promoting FDI between countries. In this section, the relationship between the impact of ethnic networking and the level of institutional development is examined. The discussions suggest two mechanisms through which ethnic Chinese networks promote bilateral FDI: community enforcement of sanctions and assistance in overcoming informational barriers. Assuming the first mechanism is important mainly for investment destined to countries with weak institutions, the two effects may be able to be evaluated by dividing the bilateral FDI into two groups, depending on the level of bureaucratic quality in the host countries.

In the left panel of Table 5, the dependent variable is FDI to countries where bureaucratic quality is relatively high. In the right panel, the dependent variable is FDI destined to countries where the bureaucratic quality is relatively low. If it is believed that economic development is positively correlated with a country's institutional development, we could also think of the two panels as FDI to countries with different levels of economic development.

Results in Table 5 show that the models explain 41% (left panel) and 45% (right panel) of total variance in total bilateral FDI between countries. If the models are rewritten in terms of GNPs and Per Capita GNPs, the coefficients from both panels on most of the variables are qualitatively the same. There are, however, some significant differences. In the left panel, the coefficients on measures of formal colonial ties and common birth language are positive and significant. In the right panel, neither of the two coefficients is significant. Perhaps the most important contrast between the two panels is the coefficient for the host country's average tariff rate. The estimate is negative in the

left panel while that in the right panel is positive, both statistically significant. It suggests that tariff jumping is an important motivation for FDI designated to countries with low levels of economic and institutional development.

Table 5. Gravity Model Estimation for FDI to Countries with Either Strong or Weak Institutions

	Dependent variable: FDI to countries where bureaucratic quality is high[a]				Dependent variable: FDI to countries where bureaucratic quality is low			
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
$Ln\,GNP_i$	2.06***	1.97***	1.83***	1.74***	1.08***	1.03***	1.03***	0.98***
$Ln\,GNP_j$	−0.63***	−0.55***	−0.69***	−0.59***	0.74***	0.78***	0.70***	0.74***
$Ln\,POP_i$	−0.99***	−0.79***	−1.14***	−1.09***	−0.36***	−0.33***	−0.38***	−0.36***
$Ln\,POP_j$	1.91***	1.72***	1.26***	1.10***	0.48***	0.41***	0.31**	0.25*
$Ln\,CHIN_{ij}$			0.32***	0.31***			0.07***	0.07***
$Ln\,DIST_{ij}$	−0.45*	−0.48**	−0.53**	−0.58**	−1.13***	−1.08***	−1.16***	−1.10***
EEC_{ij}	3.01***	2.55***	2.46***	1.99***	2.02***	1.92***	1.93**	1.83***
$EFTA_{ij}$	−1.06	−0.71	−1.08	−0.69	1.26	1.12	1.28	1.15
$Ln\,REM_i$	0.23	0.16	−1.57**	−1.54***	−0.22	−0.10	−0.59#	−0.46
$Ln\,REM_j$	1.47*	1.46*	−0.57	−0.45	5.19***	5.01***	4.58***	4.41***
$Ln\,TAR_j$	−1.41***	−1.46***	−0.96**	−0.98**	0.37**	0.39**	0.46***	0.47***
$Ln\,TRADE_j$	1.06#	0.89	0.02	−0.02	1.64***	1.62***	1.42***	1.41***
$GROGDP_j$	−0.38***	−0.33***	−0.42***	−0.38***	−0.08#	−0.07#	−0.08*	−0.08*
ADJ_{ij}	1.22	1.00*	1.10	0.84#	−0.57	−0.62#	−0.54	−0.58#
$COLOTIE_{ij}$	1.82***	1.65***	1.63***	1.47***	0.11	0.09	0.17	0.15
$LANGUAGE_{ij}$	2.58***	2.34***	2.28***	2.05***	−0.12	−0.13	−0.27	−0.28
Constant	1,347	1,197	175	6	−3,000***	−2,944***	−3,608***	−3,533***
A		92.75***		93.59***		26.14***		26.18***
R2-adj	0.41		0.44		0.45		0.46	
Log likelihood	−1,812	−6,764	−1,790	−6,740	−1,433	−7,338	−1,429	−7,334
LR test			43.70	47.20			8.30	8.90
LR test significant level			1%	1%			1%	1%
Number of observations	640				657			

Note: ***, **, *, and # denote the significance level of 1%, 5%, 10% and 15%, respectively.
[a] The score for a country's bureaucratic quality ranges from 0 to 6 and the mean value is about 3.6. Countries whose score is 4 and above are categorized as high in bureaucratic quality while countries whose score is 3 and below are categorized as low in bureaucratic quality. FDI to two countries are excluded from the analysis, as their scores on bureaucratic quality are 3.5.

The results in the last two columns show that the coefficient on $CHIN_{ij}$ is 0.31 in the left panel and 0.07 in the right panel, both significant, suggesting the importance of ethnic Chinese networking in facilitating bilateral FDI between countries, regardless of the institutional development status of the host countries. In addition to community enforcement of sanctions, which is important for FDI to countries with weak institutions, ethnic Chinese also promote FDI through providing crucial information. The latter might be a more important mechanism.[23]

5. Concluding Remarks

Using a standard gravity model, ethnic Chinese networks play a crucial role in facili-tating direct investment, regardless of whether the investment involves countries in Southeast Asia, or originates from industrial countries, or is destined to countries with weak institutional development. Furthermore, it is found that some evidence that ethnic networking demonstrates a decreasing marginal effect on bilateral FDI. Ethnic Chinese networks in Southeast Asia, thanks to their long history and active tradition, have been a crucial force in facilitating cross-border investment. Finally, it is found that ethnic networks promote FDI through both community enforcement of sanction and providing information. The latter might be a more important benefit.

The empirical results have also generated some interesting findings on the determi-nants of FDI. In general, it is found that investment from developing countries is driven by a large market size and low labor costs in the host countries, just as in the case of industrial countries. A large economy and increasing labor costs in source countries encourages more direct investment abroad. In addition, membership of the EC, former colonial ties and a shared native language are also important influences on FDI, especially for investors in industrial countries. It is also found that investment and trade seem to complement each other, as FDI is positively related to the host countries' trade intensity. On the other hand, there is also evidence that tariff jumping is an important motivation for investment. FDI to countries with weak institutions responds positively to host countries' average tariff rate.

What can be learned from this study? We find that ethnic Chinese networks play a significant role in promoting bilateral FDI between countries in a rather broader sense, implying that the effectiveness should not be limited to ethnic Chinese. Two questions remain for future studies. First, can evidence be found of the effect of networking activities of other ethnic groups in promoting trade and investment? Second, will the effectiveness of ethnic networking decrease with the development of new technologies that make information exchange faster, easier, and less costly?